

CHAPTER 4 FOREST ROADS



4 - Forest Roads





Forest Roads



Best Management Practices for forest roads are designed to provide greater opportunities for safe, efficient and profitable operations. A well-planned and properly constructed forest road is necessary to effectively protect the forestland and water quality when removing forest products from the harvest site.

Studies have shown that most stream sedimentation that occurs during and after timber harvesting operations is the result of improperly constructed or maintained forest roads, skid trails or landings. Sediment may enter streams from these sources if Best Management Practices are not properly installed to prevent soil erosion.

Well-drained and properly surfaced forest roads not only prevent erosion but also allow better wet weather harvesting access. Properly constructed and maintained forest roads will save money in the long run by reducing down time and lowering equipment maintenance costs associated with wet weather operations.

Specifications

1. Roads should follow contour as much as possible with grades between 2% and 10%. Steep gradients that exceed these grades may be necessary when boundary lines, SMZs, etc., require such deviation. In these instances, additional BMP measures may be necessary to mitigate the disturbance. Vary road grades frequently to help reduce road surface erosion.



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- 2. Forest Roads should be out-sloped wherever road gradient and soil type will permit. Out-sloping allows surface water to drain off of the road quickly, reducing erosion potential.
- 3. Use in-sloping or ditch and culvert type of cross-section when constructing a road where road gradients are greater than 15%, toward sharp turns, or when constructed on clay and/or slippery soils. In such cases the use of an under-road culvert positioned at a 30 degree angle to ensure proper inside road drainage is recommended.

Table 1 Suggested Spacing for Rolling Dips	
Road Grade (percent)	Distance (feet)
2-5	180
5-10	150
10-15	135
15+	120

Table 2 Suggested Spacing for Broad Based Dips	
Road Grade (percent)	Distance (feet)
2	300
3	235
4	200
5	180
6	165
7	155
8	150
9	145
10	140
12	135

- 4. Good road drainage can be ensured through the use of properly constructed and spaced water turnouts such as broad-based dips, rolling dips, culverts and lead-off ditches.
 - a. Use broad-based or rolling dips at appropriate intervals to channel water off the road. (See table for spacing guidelines.) The bottom of these structures should be out-sloped at approximately 3% to allow the removal of surface water. (See section on Specifications for construction guidelines.)
 - b. Locate and install water turnouts a minimum of 25 feet before stream crossings to disperse runoff water through undisturbed areas of the SMZ.
 - Use rip-rap or brush at the outlets of drainage structures to reduce water velocities and to avoid channelized flow as needed.
 - b. Use water bars when retiring temporary access roads. Water bars should be constructed at an angle of 30 to 45 degrees downslope with open ends to allow the removal of surface water. (See table for spacing guidelines.) (See section on Specifications for construction guidelines.)

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- 5. To help ensure proper road surface drainage, construct roads on the sides of ridges. New roads should not be constructed on the top of ridges where water tends to collect, resulting in poor drainage.
- 6. Locate new roads above flood plains and out of the lowest part of the terrain where surface water drainage can be difficult, such as the center of dry drainages.
- 7. Intermittent and perennial streams should be crossed using properly designed and constructed structures installed at right angles to the road. Structures should not impede fish passage or stream flow. (See Stream Crossings in Timber Harvesting section.)

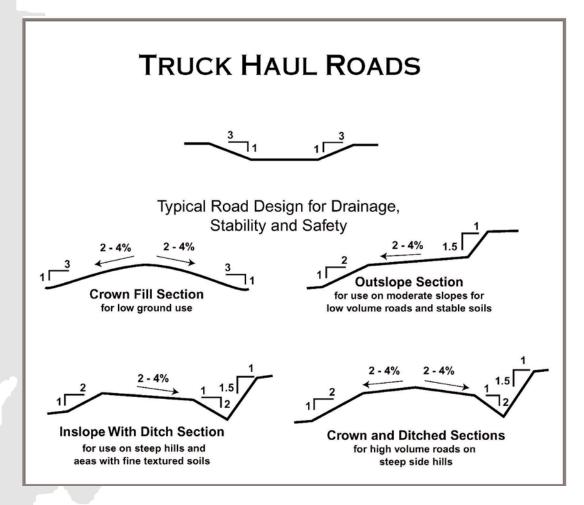
Table 3 Water Bar Spacing	
Road Grade (percent)	Distance Between Water Bars (feet)
2	250
5	135
10	80
15	60
20	45
30	35

- 8. Minimize the number of stream crossings and choose stable stream crossing sites.
- 9. Approaches to stream crossings should be stabilized with gravel, mulch or other suitable material for a minimum distance of 50 feet on each side of the crossing, or to the top of the grade that is contributing sediment to the stream crossing.
- 10. Locate access roads outside the SMZ unless no other alternative exists.
- 11. If access roads have to be located within the SMZ due to right of way, boundary line restrictions or other physical features such as rock outcroppings, additional measures must be taken to prevent erosion and/or water quality degradation. Carefully examine pre-existing roads when they are to be used for timber harvesting as drainage may be difficult.
 - a. Locate roads as far as practical from the stream channel and maintain an unbroken organic litter layer on the forest floor in the SMZ.
 - b. Roads within the SMZ should be surfaced with gravel, mulch or other suitable material to provide a non-erodible running surface.
 - c. Cut-banks and fill-slopes should be stabilized as soon as feasible to a non-erodible condition using vegetation, rock, geotextile material or other suitable material.
 - d. Install a properly constructed silt fence staked in straw bales or brush barriers at outlets of drainage structures within the SMZ. (See Specifications section.)
- 12. Roads should be "day-lighted" (shade removed) to aid in drying of the road surface.





- 13. Make road wide enough to accommodate traffic safely.
- 14. Minimize cuts and fills as much as possible during design and construction. Properly stabilize slopes exposed by road construction to prevent problems with erosion and runoff. Tall cut-slopes may require back-sloping to achieve stability and successful revegetation. Do not side-cast fill material if there is a chance that it will enter a stream, or if side slope exceeds 60%. Full bench construction with end hauling material to a suitable location is recommended when side slopes exceed 60%. (See Illustration for road cross-section profiles.)



- 15. Restrict traffic on access roads during unfavorable conditions, such as saturated soil. Gravel, wooden mats or a combination of geotextile and gravel may be used to help facilitate operations during wet periods.
- 16. Skimming or removal of saturated soils from access roads should be avoided.
- 17. When access roads intersect public highways, use gravel, wooden mats or a combination of geotextile and gravel (or other means) to help keep mud off highway entrances.



- 18. Maintain road so that water can flow freely from the road surface.
- 19. Use existing roads where practical unless use of such roads would cause or aggravate an existing erosion problem.
- 20. Avoid slide-prone areas, which are characterized by steep side slopes with unstable soil.

Maintenance

- 1. Control access by using a locked gate to prevent unnecessary damage to the road surface.
- 2. Keep drainage systems open and working both during and after logging operations.
- 3. Inspect the road at regular intervals to detect and correct maintenance problems.
- 4. When the timber harvest is complete and the road has been stabilized, control of access and road maintenance will be the responsibility of the landowner.





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